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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/781,876 | 02/20/2004 | Cheng-Cheng Liu | BHT-3183-65 | 5151 |

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| EXAMINER |
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VU, HUNG K

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| ART UNIT | PAPER NUMBER |
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2811

DATE MAILED: 04/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EF

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|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/781,876 | Applicant(s) LIU, CHENG-CHENG | |
| | Examiner Hung Vu | Art Unit 2811 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 13, 17 and 20-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Kimura (PN 6,605,869).

Kimura discloses, as shown in Figures 1-5, a multi-chip package combining wire-bonding and flip-chip configuration comprising:

a substrate (12) having an upper substrate surface and a substrate lower surface, the upper substrate surface having a plurality of contact pads (not shown);

at least one wire bonding chip (16) connected to the upper substrate surface and electrically connected to the substrate by a plurality of bonding wires (24);

a molding compound (25,26) formed on the upper substrate surface covering each of the at least one wire bonding chip and the plurality of bonding wires, the molding compound having:

two extensions [see Figure 4];

at least one recession located between the two extensions, the at least one recession being spaced apart from the plurality of contact pads;

at least one flip-chip electrical device (15) having a plurality of bumps (22) electrically connected to the plurality of contact pads of the substrate.

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Regarding claim 17, Kimura discloses the at least one recession includes two recessions, the two recession are symmetrical.

Regarding claim 20, Kimura discloses the at least one flip-chip electrical device is selected from a group consisting of a BGA package, a chip scale package, and a flip chip.

Regarding claim 21, Kimura discloses the package further comprising a plurality of solder balls (13) located on the substrate lower surface.

Regarding claim 22, Kimura discloses the package further comprising a heat sink (14) connected to the molding compound and the at least one flip-chip electrical device [note that Kimura discloses a hollow center (14) as a coolant path where a cooling gas and a cooling liquid are flown, therefore, it is inherent that the hollow center also functions as the heat sink].

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14-16, 18-19 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura (PN 6,605,869).

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Regarding claim 14, Kimura discloses the claimed invention including the package as explained in the rejection above. Lin does not disclose a distance from the recession of the molding compound to the contact pads is more than 1.0 mm. Although Kimura does not teach the distance from the recession of the molding compound to the contact pads, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the recession having a desired distance, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 15-16 and 18-19, Kimura discloses the claimed invention including the package as recited in the rejection above. Kimura does not disclose the recession is in a shape of an arc or a quarter-circle, and the molding compound is in a L-shape or U-shape. However, the shape differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Circ. 1990).

3. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura (PN 6,605,869) in view of Chung et al. (PN 6,525,406, of record).

Kimura discloses the claimed invention including the package as recited in the rejection above. Kimura does not disclose the molding compound has at least one step or at least one indentation located on a surface opposite the substrate. However, Chung et al. discloses a package comprising a molding compound having at least one step or at least an indentation (48) on the

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exposed surface of the molding compound. Note Figure 7 of Chung et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the molding compound of Kimura having at least an indentation on the exposed surface of the molding compound, such as taught by Chung et al. in order to serve as a recognition mark for marking the molding compound.

4. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura (PN 6,605,869) in view of Tao et al. (PN 6,191,360, of record).

Kimura discloses the claimed invention including the package as explained in the rejection above. Kimura does not disclose the substrate has a molding gate metal layer. However, Tao et al. discloses a substrate (30) has a molding gate metal layer (32). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the substrate of Kimura having a molding gate metal layer, such as taught by Tao et al. in order to assist in removing the molding compound formed on top of the molding gate metal layer.

Response to Arguments

5. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Mon-Thurs 6:00-3:30, alternate Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272-1732. The Central Fax Number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

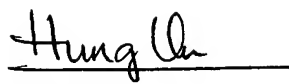
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Vu

March 30, 2005

A handwritten signature in cursive script, appearing to read "Hung Vu", is written over a horizontal line.

Hung Vu

Primary Examiner